What is Claimed Is:

1. A method of digital filtering of a digitized input stream in accord with a predetermined filter function approximating a sum of products of a series of one or more first coefficient values and a series of one or more one or more delayed samples from a digital output stream added together with a sum of products of a series of one or more second coefficient values and a series comprising a one or more samples from the digital input stream, the digital filtering method comprising the steps of:

combining predetermined sets of one or more samples from the digital input stream and one or more samples from the digital output stream, to form a plurality of respective numeric input values;

scaling each of the plurality of respective numeric input values by a different power of a base numeric value for the digital filtering, to form a respective one of a plurality of scaled values; and

adding the scaled values together to form the digital output stream in accord with the predetermined filter function.

2. A method as in claim 1, wherein the base numeric value is 2, and the step of scaling comprises shifting each respective numeric input value by a different number of bit positions, so as to scale the respective numeric input value by a different power of 2.

3. A digital filter for processing samples of a digital input stream in accord with a predetermined filter function, comprising:

means for combining predetermined sets of one or more samples from the digital input stream and one or more samples from a digital output stream of the filter, to form a plurality of respective numeric input values;

means for scaling each of the plurality of respective numeric input values by a different power of a base numeric value used to implement the digital filter, to form a respective one of a plurality of scaled values; and

means for adding the scaled values together to form the digital output stream in accord with the predetermined filter function.

4. A digital filter as in claim 3, wherein the means for combining, the means for scaling, and the means for adding are implemented in a digital signal processor.

5. A digital filter for processing samples of a digital input stream in accord with a predetermined filter function, comprising:

a plurality of scalers, each for scaling a respective input sample value by a different power of a base numeric value to form a respective scaled value;

one or more combining circuits, for combining predetermined sets of one or more samples from the digital input stream with one or more samples from a digital output stream of the digital filter, to form respective input sample values for input to the scalers; and

an adder coupled to outputs of the scalers for totaling the respective scaled values, to form the digital output stream of the digital filter in accord with the predetermined filter function.

6. A digital filter as in claim 5, further comprising:

a first multi-tap delay line, coupled to receive the digital input stream, for supplying predetermined samples from the digital input stream to the one or more combining circuits; and

a second multi-tap delay line, coupled to an output of the adder, for supplying predetermined samples from the digital output stream to the one or more combining circuits.

7. A digital filter as in claim 5, wherein the base numeric value is 2, and each of the scalers comprises a shift circuit, for shifting the respective input sample value by a specific number of bits, so as to scale the respective input sample value by a different power of 2.

8. A digital filter for processing samples of a digital input stream without numeric multiplication, the digital filter comprising:

a plurality of scalers, each for scaling a respective input sample value by a different power of a base numeric value, to form a respective scaled value;

a plurality of combining circuits, each combining circuit for combining a predetermined set of samples from the digital input stream and samples from a digital output

stream of the digital filter, to form a respective input sample value for input to one of the scalers; and

an adder, coupled to outputs of the scalers, for totaling the respective scaled values, to form the digital output stream of the digital filter without numeric multiplication,

wherein the digital filter exhibits a predetermined filter function approximating: a sum of products of a series of one or more first coefficient values and a series of one or more one or more samples from the digital output stream, added together with a sum of products of a series of one or more second coefficient values and a series comprising a one or more samples from the digital input stream.

9. A digital filter as in claim 8, further comprising:

a first multi-tap delay line, coupled to receive the digital input stream, for supplying samples from the digital input stream to the combining circuits; and

a second multi-tap delay line, coupled to receive the digital output stream from the adder, for supplying samples from the digital output stream to the combining circuits.

10. A digital filter as in claim 8, wherein the base numeric value is 2, and each of the scalers comprises a shifter for shifting the respective input sample by a respective number of bit positions, so as to scale the respective input sample value by a different power of 2.

11. A method of digital filtering of a digitized input signal in accord with a predetermined filter function comprising

$$y(n) = \sum_{i=1}^{M} a_i \cdot y(n-i) + \sum_{i=0}^{N} b_i \cdot x(n-i)$$

where a_i and b_i are numerical coefficient values, x is the digital input and y is the digital output, the digital filtering method comprising:

converting each the numerical coefficient values of a_i and b_i into the form of:

$$a_i = \sum_{j=L_1}^{L_2} a_i^{[j]} \cdot 2^j$$

$$b_i = \sum_{j=L_1}^{L_2} b_i^{[j]} \cdot 2^j$$

wherein L_1 and L_2 are two integers, such that:

$$2^{L_2} \geq a_i \geq 2^{L_1}, \text{ for } i = 1,\ldots,M$$
$$2^{L_2} \geq b_i \geq 2^{L_1}, \text{ for } i = 1,\ldots,N$$

and the converted coefficients $a_i^{[J]}$ and $b_i^{[J]}$ have binary values of 1 or 0;

sequentially receiving and delaying a plurality N of most recent samples of the input signal *x*; and

scaling combinations of specific ones of the N received and delayed samples of the input signal and specific samples from a predetermined number M of delayed output signals, by respective scaler values and combining respective scaled values so as to produce output signals by approximating the digital filter function *y(n)* in the following form:

$$y(n) = \sum_{J=L_1}^{L_2} \left(\sum_{i=1}^{M} a_i^{[J]} \cdot y(n-i) + \sum_{i=0}^{N} b_i^{[J]} \cdot x(n-i) \right) \cdot 2^J .$$

12. A wireless spread-spectrum receiver, comprising:

an antenna for receiving a wireless spread-spectrum signal;

an analog to digital converter coupled to the antenna for converting the received wireless spread-spectrum signal to a digital input stream;

a digital filter for processing samples of the digital input stream in accord with a predetermined filter function, the digital filter comprising:

(a) means for combining predetermined sets of one or more samples from the digital input stream and one or more samples from a digital output stream of the filter, to form a plurality of respective numeric input values;

(b) means for scaling each of the plurality of respective numeric input values by a different power of a base numeric value for the digital filter, to form a respective one of a plurality of scaled values; and

(c) means for adding the scaled values together to form the digital output stream in accord with the predetermined filter function; and

a direct sequence spread spectrum demodulator coupled to the digital filter, for processing the digital output stream to recover data or signaling information.